U.S. Environmental Protection Agency
Region I

Office of Site Remediation and Restoration

Silresim Chemical Corp. Superfund Site
Lowell, Massachusetts

Five-Year Review (Type I-A)

September 1999

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I - NEW ENGLAND
5-YEAR REVIEW REPORT (TYPE 1A)
SILRESIM SUPERFUND SITE (LOWELL, MASSACHUSETTS)

I. INTRODUCTION

A. Authority Statement

The U.S. Environmental Protection Agency (EPA) Region 1 conducted this review pursuant to CERCLA section 121(c), NCP section 300.400(f)(4)(ii), and OSWER Directives 9355.7-02 (May 23, 1991), and 9355.7-02A (July 26, 1994). It is a statutory review. The purpose of a five-year review is to ensure that a remedial action remains protective of public health and the environment and is functioning as designed. This document will become part of the Site File. This review (Type 1a) is applicable to a site at which a remedial response is ongoing.

B. Site Characteristics

The site is located at 86 Tanner Street in an industrial area of Lowell, Massachusetts, approximately one mile south of the central business district. The original facility (Silresim Chemical Corporation) consisted of approximately 4.5 acres (Silresim Property); however, the National Priorities List (NPL) geographically defines the Silresim Site (the Site) as the extent of contamination which includes approximately 16 acres containing groundwater contamination and seven acres of soil contamination (EPA, 1991). The 4.5-acre former Silresim Property, is bordered by the Lowell Iron and Steel Company to the north, the B&M railroad yard and tracks to the east/northeast, an automobile salvage yard to the south, and Tanner Street to the west. Residential areas are located south, east, and northeast of the Silresim property, with the closest residences located on Canada, Main, and Maple Streets, roughly 300 to 500 feet from the Silresim Property boundary. River Meadow Brook lies approximately 400 feet west of the Silresim Property boundary.

The Site and its surrounding areas have been used for industrial activities since the early 1900's. From 1916 to 1971, several petroleum companies used the Site as an oil and fuel storage depot. From 1971 through 1977, the Silresim Chemical Corporation operated a chemical waste reclamation facility on the site. The facility's primary operations included recycling and reclaiming various chemicals and consolidating wastes for off-site disposal. Wastes were accepted at the Site in drums, tank trucks, railroad tanker cars, and other containers. These substances included halogenated solvents, oily wastes, alcohols, plating wastes, metal sludges and pesticide wastes. The Record of Decision (ROD) estimated that the facility handled approximately three million gallons of waste per year.

The Silresim Chemical Corporation filed for bankruptcy in late 1977 and abandoned the Site in January 1978, leaving approximately one million gallons of hazardous materials on-site in drums and bulk tanks. Almost 30,000 decaying drums remained on the property covering virtually all open areas of the Site. Investigations revealed that the Site had been poorly maintained and revealed evidence of numerous spills, leakage of drums, discharges to Lowell sewers, and runoff to adjacent property.

C. Environmental Investigations

A Remedial Investigation (RI) was conducted at the Site by the PRPs between 1985 and 1990 (GZA, 1990). The RI provided an assessment of the type and extent of contaminants present at the Site and was accompanied by a risk assessment, which evaluated the potential impacts upon human health and the environment posed by Site conditions. The RI provided baseline data required to evaluate potential cleanup actions. Principal RI field activities included the collection and analysis of groundwater, soil, sediment, surface water, and air samples. These analyses identified approximately 100 contaminants in on-site groundwater and soils. Primary among them were volatile organic compounds (VOCs). In addition, metals, polychlorinated biphenyls (PCBs), herbicides, pesticides, and dioxin were identified.

A Supplemental RI was conducted by the EPA during the fall and winter of 1990/91 (CDM, 1991). The objectives of this Supplemental RI were to further determine the extent and distribution of dense non-aqueous phase liquid (DNAPL) in the shallow overburden and bedrock aquifers underlying the Site, and to evaluate the hydraulic properties of bedrock.

VOCs were identified as the predominant chemical contaminants which were (and continue to be) detected in groundwater at the Site. A relatively high concentration groundwater VOC plume was identified in the outwash deposits at the site extending from the south of the Silresim Property, north across the Lowell Iron and Steel property. Over 70 VOCs were identified in the plume, including aliphatics, volatile aromatics, and ketones. Representative contaminants and concentrations included 1,2-dichloroethene, methylene chloride, 1,1,1-trichloroethane, and trichloroethene all reported at concentrations between 1,000 and 2,000 mg/l. Overall, the highest VOC concentrations were observed on and to the immediate north of the Silresim Property. VOCs were also detected throughout the outwash deposits, down to bedrock and at depths of up to 120 feet below ground surface (bgs).

In addition to VOCs, some semivolatile organic compounds (SVOCs) were reported in groundwater, generally at concentrations significantly less than those observed for the VOCs. SVOCs which were reported included isophorone, 1,2-dichlorobenzene, benzoic acid, and phenol. SVOC concentrations typically ranged from 0.1 to 40 mg/l and tended to be more localized than VOCs. Metals were sporadically detected in groundwater at various monitoring locations. Among those metals which have been reported are chromium, nickel, and zinc. Maximum concentrations for these metals were generally reported between 1 and 2 mg/l.

A variety of VOC, SVOC, and metals were identified in surficial soils at the Site which varied depending upon site location. VOCs were relatively widespread including portions of the Silresim Property, the former Arrow Carrier Property (to the south of the Silresim Property), and localized areas of the Lowell Iron and Steel Property. SVOCs including PAHs, phthalates, PCBs, chlorinated benzenes and dioxins were elevated at the southern end of the Silresim Property and portions of the Lowell Iron and Steel Property. Some elevated metals concentrations were observed, primarily in the southeastern portion of the Silresim Property. In unsaturated subsurface soils down to approximately 6-10 feet bgs VOCs were the primary contaminants which were observed. Total VOC concentrations in unsaturated soils across the Site were generally found to range from 100 to 1,000 mg/kg. In addition to VOCs, a number of SVOCs including phthalates, PAHs, and chlorinated benzenes were reported in localized areas with maximum concentrations in the 10-500 mg/kg range. Metals including arsenic, chromium, copper and mercury were also sporadically detected at elevated concentrations.

II. DISCUSSIONS ON REMOVAL AND REMEDIAL ACTIONS

A. Removal Actions

From 1978 to 1982, the Massachusetts Department of Environmental Quality Engineering (DEQE), now Massachusetts Department of Environmental Protection (MADEP), secured the Site and minimized immediate threats to public health and the environment. MADEP constructed a site fence, hired a 24-hour guard, removed liquid wastes in the on-site drums and above-ground tanks, constructed berms and absorbent filled trenches to reduce the spread of waste through surface runoff, and conducted studies of the site soils and groundwater.

In 1982, EPA placed the Site on the NPL for long term cleanup. Between the spring of 1983 and December 1984, EPA removed all structures remaining on the Site, extended the fence, and placed a clay cap over the Site. Subsequently the site was graded and covered with approximately nine inches of gravel and a clay cap averaging 14 inches in thickness was then placed over the gravel layer. This work was completed in 1984. In addition, crushed stone was place over the areas of surficial soil contamination adjacent to the cap's northern and southern borders and at the northeast corner of the site.

EPA expanded the Silresim fence line in August 1986 to enclose an area of surficial soil contamination at the southeastern corner of the site encountered during initial phases of the RI. In December 1986, contractors engaged by EPA placed a 6-inch to 8-inch thick layer of crushed stone around the perimeter of the expanded fence line to limit potential exposure to surficial soils in this zone. The crushed stone area extends 10 to 20 feet east, south and west of the of the expanded fence line and covers a zone of dioxin contaminated surficial soils encountered during the study.

On July 12, 1985, EPA issued an Administrative Order by consent to the Silresim Site Trust, a group of Potentially Responsible Parties (PRPs), who agreed to undertake a Remedial Investigation/Feasibility Study (RI/FS) to investigate site conditions and evaluate potential cleanup alternatives which would address contamination at the Site.

B. Remedy as Specified in the ROD

On September 19, 1991, EPA issued a ROD which identified the remedy for the Site (EPA, 1991). The remedial response selected for the Site consists of Management of Migration and Source Control components.

The Management of Migration and Source Control remedy components were developed to achieve the following remedial action objectives for the Site:

- Prevent direct contact and incidental ingestion exposure to contaminated surficial soils at the Site (located on and off the Silresim Property);
- Prevent future migration of contaminated groundwater to a hypothetical water supply well; thereby reducing risks from ingestion of contaminated drinking water;
- Prevent contaminated groundwater discharge to surface waters, thereby reducing risks from dermal absorption and ingestion exposures to contaminated surface water and sediments; and
- Prevent contaminated groundwater flow towards buildings thereby reducing risks from inhalation exposures.

B.1 Management of Migration (MOM)

The MOM portion of the remedy includes the following major components:

- Implement public education programs;
- Implement institutional restrictions on future water use;
- Install groundwater extraction wells, pumping equipment and associated piping;
- Install treatment equipment, building, and discharge piping;
- Start-up and operate extraction, treatment, and discharge systems;
- Dispose of non-aqueous phase contaminants and secondary wastes generated during the operation of the treatment process; and
- Perform long-term monitoring and five-year reviews.

The objective of the groundwater extraction system as stated in the ROD is the following:

- Halt further migration of contaminated groundwater toward identified receptors (basements, River Meadow Brook, East Pond),
- Capture as much of the contaminant plume as possible, and
- Achieve drawdowns across the Site in support of the Source Control remedy.

The target groundwater cleanup levels selected for the Site are based upon the classification of the groundwater at the Site as a potential source of drinking water. Therefore, EPA used Maximum Contaminant Levels (MCLs) promulgated under the Safe Drinking Water Act as cleanup goals to be applied to the site groundwater within the aquifer. The cleanup goals are intended to address several of the remedial action objectives discussed above and are protective of human health and the environment.

B.2 Source Control

The Source Control portion of the remedy includes the following major components:

- Post signs at the Site, construct additional perimeter fence and maintain the existing fence;
- Implement public education programs and institutional controls;
- Perform pilot test of vacuum/vapor extraction system to optimize final design;
- Construct the vacuum/vapor extraction system including placement of a low-permeability temporary cover over areas of contaminated soil off the Silresim property;
- Extend and repair the cap on the Silresim Property as required;
- Start-up and operate vacuum/vapor extraction system until acceptable VOC concentrations in soil are reached;
- Perform additional bench-scale and/or pilot scale stabilization/solidification studies;
- Strip and stockpile existing clay cap and gravel;
- Excavate and stockpile all soils requiring stabilization;
- Backfill areas outside of Silresim Property with clean fill;
- Stabilize contaminated soils;
- Perform confirmatory TCLP analyses;
- Place treated soil under RCRA cap;
- Upgrade existing cap to conform to RCRA Subtitle C standards; and
- Perform long-term monitoring and five-year reviews.

The Source Control remedy is intended to address several of the remedial action objectives for the Site noted above. Contaminant specific soil cleanup goals were established to prevent leaching and achieve MCLs in site groundwaters, and to reduce risks of dermal exposure and incidental ingestion.

C. Status of Remedial Actions To Date

This section discusses the remedial actions which have been implemented since the ROD was issued. The major activities associated with each remedy component are identified and pertinent information relating to ongoing operations is summarized.

C.1 MOM Remedial Actions

The MOM remedial actions which have been undertaken at the Site are briefly described herein. Individual MOM remedial actions are discussed in terms of ongoing operation and effectiveness.

Construction of Groundwater Treatment Plant (GWTP) and Extraction Wells

On November 5, 1994, remedial activities for the groundwater pump and treat remedy commenced at the Silresim Site. The major components of the MOM Remedial Action are the groundwater extraction system, consisting of 25 extraction wells with in-well pumps to contain and intercept the contaminant plume, and construction of the GWTP which was completed in November 1995. The function of the GWTP is to extract and treat the contaminated groundwater prior to discharge to the existing sanitary sewer. The primary focus of the GWTP operations is VOC removal and destruction.

The groundwater extraction system consists of extraction wells installed at specific locations to achieve required groundwater drawdown and yield from two distinct aquifer flow regimes. There are 25 extraction wells located on-site yielding a nominal 23 gallons per minute (gpm) of total flow. Each groundwater extraction well is independently piped to the GWTP where the flow streams are combined for treatment. The GWTP was designed to accept and treat dissolved VOCs, SVOCs, and dissolved and suspended metals in the influent groundwater stream.

Groundwater Extraction

Normal operations consist of operating the 13 shallow extraction wells to maximize withdrawal from the shallow aquifer. Two moderate and nine deep overburden extraction wells and the bedrock well are then operated to maximize the total combined influent flow rate up to approximately 23 gpm. The total plant capacity is 25 gpm. The two moderate depth extraction wells are located near East Pond to the southeast of the Silresim Property. These two wells are currently not in operation since no evidence of significant plume migration toward the pond is being observed.

Following the GWTP startup in November 1995, all shallow overburden extraction well pumping rates were less than the design basis flow rate of one gpm. The average shallow pumping rates have ranged from 0.23 gpm to 0.33 gpm which is only 23-33% of the original design. Each deeper extraction well (two intermediate depth, nine deep overburden, and one shallow bedrock) was designed with an extraction flow rate of 1 gpm (CDM, 1994). The average moderate to deep pumping rates for almost four years of operation range from 1.3 to 1.7 gpm per well.

The groundwater extraction system objective of achieving drawdowns across the Site does not appear to be occurring. Long term reductions in water levels observed across the Site appear to be a consequence of seasonal fluctuations in precipitation, not as a result of groundwater extraction. The consecutive occurrence of the wettest year on record (1996) followed by an extremely dry year (1997) created an impression of extensive aquifer drawdown during this time period. A return to a more normal range of precipitation events in 1998 negated aquifer drawdowns achieved during the prior year.

Overall, the operation of the GWTP and extraction wells has resulted in VOC contamination concentration reduction in the Silresim plume, although the extent of the VOC reduction varies significantly depending on the specific area of the Site in question. In some site areas, groundwater VOC concentration reductions of over 50% have been observed. However, in other areas of the plume, VOC levels have actually increased due to plume migration and remain over four orders of magnitude above the cleanup levels established in the ROD. Operation of the extraction well array and GWTP has also resulted in the removal of a significant quantity (mass) of VOCs from the groundwater plume (over 39 tons).

C.2 Source Control Remedial Actions

This section discusses the Source Control remedial actions which have been undertaken at the Site since the issuance of the ROD and presents the effectiveness of these efforts to date.

Lowell Iron and Steel Soil Investigation

A Predesign Soil Investigation was undertaken during 1995 (Foster Wheeler, 1995) on the Lowell Iron and Steel properties in conjunction with the implementation of the Source Control remedies at the Silresim Site. The purpose of this investigation was to better characterize the nature and extent of surficial and subsurface (primarily unsaturated zone) soil contamination, and to refine estimates of the volume of contaminated soils requiring remediation. A total of 21 borings were located in a grid across the Lowell Iron and Steel property. Borings were advanced to depths ranging from 8 to 14 feet bgs. Analytical results indicated the presence of both chlorinated and aromatic VOCs in the soils, with VOC concentrations ranging from trace levels to levels in excess of 12,000 mg/kg in subsurface soils. In general, only very low levels of VOCs (<1 ppm) were detected in surface soils (0-0.5 bgs) and generally did not exceed ROD cleanup levels. Soil volume calculations based on the reported data, indicated that an estimated 37,000 cubic yards (cy) of surface and subsurface soil required treatment for VOCs based on comparison to ROD cleanup levels. In addition, an estimated 2,200 cy of the VOC contaminated soil exceed the ROD cleanup levels for non-VOC contaminants.

Air Permeability and SVE Pilot Tests

From July 1995 to December 1996, Air Permeability and SVE pilot tests were completed to fulfill the pilot test requirement of the ROD and to determine the effectiveness of SVE for removing the subsurface contaminants to levels established in the ROD.

Air Permeability Testing included a series of tests at multiple locations across the Site to collect flow versus vacuum measurements along with soil gas samples for laboratory analyses. In general, it was found that extracted vapor flow rates were quite low for the extraction wells (up to about 9 scfm). The total VOC concentrations in the extracted soil vapor ranged from 2 to 31,000 ppmv, though the concentrations were typically in the hundreds of ppmv.

Limited data (regarding pneumatic conductivity or air permeability) were obtained during Air Permeability Testing because of very high moisture content in the soils. The resulting vapor extraction flow rates and radii of influence were much lower than expected and in most locations the vacuum influence could not be measured even a few feet from the extraction point.

Because of the difficulty encountered in extracting soil vapor during the Air Permeability Test, a new approach to the Pilot Test became necessary. Rather than attempting to optimize the SVE extraction process, Pilot Testing primarily focused on increasing the achievable flow rate from the subsurface. To do this, the pneumatic conductivities of the soils had to be improved by reducing the moisture in the soils by use of SVE enhancement technologies.

The Pilot Test consisted of three SVE techniques (baseline or conventional SVE, heated air injection and SVE, and high vacuum or multiphase SVE) with the following major components:

- Baseline Extraction Pilot Testing;
- Heated Air Injection Pilot Testing and Modeling;
- Area 5 Pilot Testing, which included High Vacuum Soil Vapor Extraction (HVSVE), Multiphase Extraction (MPE) and Dewatering and VE (D/VE);
- Tracer Gas Testing;
- Soil Moisture Measurements;
- Soil Pneumatic Conductivity Measurements; and
- Subsurface Air Modeling

The Pilot Test included simultaneous operation of the multiple techniques for approximately four months across five areas of the Site. Several significant conclusions and findings resulted from the conditions identified and data gathered from the Air Permeability and SVE Pilot Tests (Foster Wheeler, 1995b; Foster Wheeler, 1997b). These conclusions were as follows:

- Over 20 different VOCs were detected in the extracted soil vapor;
- SVE has the potential to significantly reduce the amount of subsurface volatile organic contaminant mass from the surficial and unsaturated soils, however, SVE is not likely to reduce the subsurface soil contamination to ROD established cleanup levels within the time frame established in the ROD;
- Several site conditions were identified at Silresim which limit the effectiveness of SVE in removing the contaminants from the soil. These conditions are as follows: 1) low permeability soils; 2) shallow groundwater table; 3) high soil moisture content; and 4) clay cap with gravel layer causing short-circuiting. Elevated soil moisture levels are the primary limiting factor for the successful implementation of SVE at the Site;
- Heated air injection in conjunction with SVE may increase the rate of contaminant removal;
- Dewatering and soil vapor extraction (D/VE) combined in a groundwater extraction well have the potential to remove significant contaminant mass;
- High Vacuum Soil Vapor Extraction and Multiphase Extraction were shown to be ineffective extraction techniques, resulting in no vapor flow or radial influence;

During the Pilot Test and associated Air Permeability Test, approximately 4,100 pounds of VOC contaminants were removed.

Cap Drainage Improvements

A clay cap was installed on the Silresim Property between the Spring of 1983 and December 1984. The installation of the GWTP extraction well piping in 1994 required the placement of mounded rows of fill (corn rows) above the piping to protect the piping from freezing. The above-grade "corn rows" had resulted in a number of areas where surface water runoff was ponding on the clay cap. In order to remove this ponded water and reduce the amount of precipitation infiltrating through the cap, thereby improving the SVE and GWTP efficiency, an upgrade of the existing cap was completed. Following an evaluation of various cover upgrade scenarios, the cap upgrade that was implemented in the Fall of 1998 included re-grading areas of the cap to promote drainage of surface water off the cap and placement of a 6-inch layer of topsoil and seed on the entire cap. The topsoil and seed was added as a temporary measure to protect the clay cap from desiccation and erosion and therefore enable the clay to act as an effective barrier to surface water infiltration. The cap is scheduled to be further upgraded in the future to conform to RCRA Subtitle C standards.

Phase I SVE

Since it was concluded that conventional or enhanced SVE would not likely attain the cleanup levels established in the ROD, a new approach was established for completing this phase of the Source Control Remedy. The EPA, MADEP, and the U.S. Army Corps of Engineers (USACE) developed a plan for the application of SVE at the Site with the objective of maximizing the removal of VOC mass instead of attempting to achieve ROD cleanup levels. Following a 14 month O&M period, the results of the ongoing Phase I SVE operation will be reviewed by the EPA, USACE, and MADEP.

Phase I SVE is scheduled for approximately fourteen months (October 1998 to December 1999) across five areas of the Site. EPA, MADEP, and the USACE will review the SVE operation to determine if the application of SVE at the Silresim Site should continue. The following are some preliminary observations:

- Conventional SVE (i.e., SVE with no enhancements such as Ambient Air Injection) is the main treatment technology implemented during Phase I SVE. The majority of the extracted VOC contamination and flow removed during Phase I SVE is attributable to areas north and east of the GWTP.
- Ambient Air Injection was implemented to compare the relative effects of the heating component of the injected air as contrasted with the measured improvements in subsurface vapor flow and contaminant mass removal due simply to the injection of ambient air. The initial findings of this work include the following:

    1. There was a measured improvement in the rate at which soil vapor was extracted from the subsurface, although injection flows indicated there was no moisture reduction or pneumatic conductivity increase in subsurface soils.
    2. Only minor improvement was observed relative to the rate at which contaminant mass was extracted during Ambient Air Injection as compared to Conventional SVE performed during the preceding month in the same area. During Heated Air Injection, there was a notable increase in the rate at which the contaminant mass was extracted as compared to conventional SVE.

- D/VE is being implemented at three areas of the Site; however, while extracted soil vapor concentrations are very high, the extraction flow rate is very low, which indicates low effectiveness for cleaning soil in these areas.

Overall, remedial action work completed to date indicates that SVE technologies are capable of significant VOC mass reduction in unsaturated zone soils. However, SVE will not achieve soil cleanup goals as outlined in the ROD.

D. Remedy Limitation and Concerns

The remedial results noted above indicate that a number of potentially significant limitations and deficiencies exist with respect to meeting the ROD goals and objectives originally identified for the Site; these are further discussed in the Remedy Review Report completed in 1999 (Foster Wheeler, 1999). With respect to groundwater remediation efforts, evidence to date indicates that the extraction well system can not meet ROD objectives for groundwater drawdown. In addition, there has been extensive plume migration beyond the extraction well array. Therefore EPA continues to be concerned regarding possible VOC vapor inhalation at the Lowell Iron and Steel facility and also VOC migration into the nearby municipal sewer system. However, sampling has been conducted in both the Lowell Iron and Steel facility and nearby sewers, as recently as this summer, and to date VOC's have not been detected at concentrations which represent a risk to human health.

It is not anticipated that the groundwater remedy will meet ROD cleanup goals within the foreseeable future. In many areas of the Site, individual VOC concentrations remain up to four orders of magnitude above cleanup goals after more than three years of groundwater extraction and treatment.

Regarding Source Control, the Pilot Test results indicate that SVE alone will not be able to reduce subsurface soil contamination to ROD established cleanup levels within the time frame established in the ROD. Even with some of the SVE enhancements evaluated during the Pilot Test, which could increase the volume and rate of VOC removal, it is not likely that the ROD cleanup levels will be achieved. Soil VOC concentrations over a large portion of the unsaturated zone on the Silresim and Lowell Iron and Steel properties exceed ROD cleanup standards (typically 1-10 ppb for individual VOCs) by up to four orders of magnitude. SVE will not achieve ROD cleanup goals for VOCs due to the following: 1) low permeability soils, 2) a high groundwater table, 3) high soil moisture contents in the unsaturated zone, and 4) a clay cap with an underlying gravel layer causing short circuiting.

In evaluating the overall limitations of both the MOM and Source Control remedies, one important theme which emerged is the pivotal role of the results of the existing risk assessment in establishing ROD objectives and cleanup goals. The existing risk assessment for the Site was generally consistent with the standard technical practices and assumptions at the time of its preparation. However, many important risk assessment assumptions no longer appear to be appropriate for the Site. These include the following: 1) the assumption of the aquifer beneath the Site as a drinking water supply, 2) the application of a very conservative soil leaching model, 3) a relatively conservative treatment of PAH and dioxin risks, and 4) a treatment of exposure pathways which may not longer reflect current site conditions or future uses.

With respect to groundwater remediation, it should be noted that in October 1998, MADEP completed a Groundwater Use and Value determination which recommended a "low use and value" as opposed to the current drinking water classification for the groundwater beneath the Site. Discussions are currently ongoing between the MADEP and EPA regarding its potential implication for the Site.

III. RECOMMENDATIONS

The evaluation of the remedial action results to date indicate that the selected remedy is not likely to achieve all of the Remedial Action Objectives set forth in the ROD. The evaluation also indicates that this inability to meet objectives is due to the stringency of the cleanup goals, site conditions including the nature and extent of contamination, and the technical limitations of current remedial technologies. The evaluation also indicates that some of the original Remedial Action Objectives warrant revision. The aforementioned ROD Remedy Report sets forth a series of suggested actions which EPA should undertake which will likely lead to an amendment to the 1991 ROD. The EPA and the COE are currently evaluating these suggestions and are formulating and action plan which will be completed in the near future. In the meantime ongoing remedial actions will be continued at the site including the following:

- Adjustment and enhancement of the groundwater extraction well system to attain more complete capture of the contaminant plume and minimize its migration from the Silresim property.
- Monitoring of contaminant (VOC's) vapors in the Lowell Iron and Steel cellar space(s) to insure that workers are not exposed hazardous levels.
- Operation and maintenance of the Groundwater Extraction and Treatment System(s).
- Efforts to reduce contaminant (VOC's) mass in site soils.
- Identification and evaluation of new and innovative technologies for soil and groundwater remediation.
- Monitoring of the groundwater under and in the general area of the site.

IV. STATEMENT ON PROTECTIVENESS

The Remedy selected in the Sept.,1991 ROD is not expected to be protective of human health and the environment. However immediate threats have been addressed and current conditions at the site are protective of human health and the environment. Certain portions of the Remedy, as set forth in the 1991 Record of Decision, as discussed above, will not meet cleanup levels established in the ROD. EPA has undertaken an evaluation of the selected remedy, including new information obtained during the conduct of remedial actions at the site, and will develop and issue an alternate approach to the site cleanup as soon as is possible.

V. NEXT FIVE-YEAR REVIEW

The next five-year review will be conducted by November 5, 2004. This date is ten years from the day remedial activities for the groundwater pump and treat remedy commenced at the Site. This remedial action start date is the most accurate historic date available with which to track periodic reviews.

Patricia L. Meaney, Director
Office of Site Remediation & Restoration

9/29/99
Date

TD99-158
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